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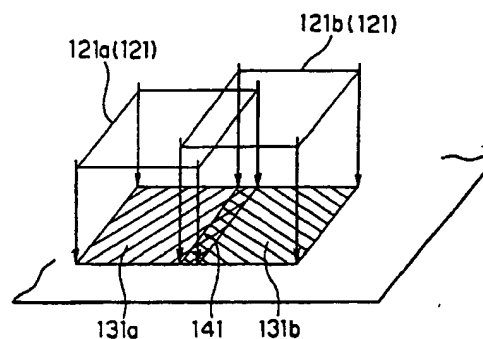
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(54) Method of forming polycrystalline silicon layer and surface treatment apparatus therefor

(57) A method of forming a polycrystalline silicon thin film improved in crystallinity and a channel of a transistor superior in electrical characteristics by the use of such a polycrystalline silicon thin film. An amorphous silicon layer of a thickness preferably of 30 nm to 50 nm is formed on a substrate. Next, substrate heating is performed to set the amorphous silicon layer to preferably 350°C to 500°C, more preferably 350°C to 450°C. Then, at least the amorphous silicon layer is exposed to laser light of an excimer laser in an extent greater than approximately 10 cm² by single shot exposure. The energy density is 100 mJ/cm² to 500 mJ/cm², preferably 280 mJ/cm² to 330 mJ/cm². The pulse width is 80 ns to 200 ns, preferably 140 ns to 200 ns, so as to directly anneal the amorphous silicon layer and form a polycrystalline silicon thin film. The total energy of the laser used for the irradiation of excimer laser light is at least 5J, preferably at least 10J.

A surface treatment laser apparatus and different surface treatments e.g. oxidation or nitridation are also described.

FIG. 1





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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	EP-A-0 373 055 (COMMISSARIAT À L'ÉNERGIE ATOMIQUE)	11,13,	H01L21/20
A	* the whole document *	17,23,27	B23K26/06
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A	* the whole document *	17,23,27	
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		21,22,24	
A	PATENT ABSTRACTS OF JAPAN vol. 17, no. 89 (E-1323), 22 February 1993 & JP-A-04 282869 (JII TEI SHII KK), 7 October 1992, * abstract *	1,7	

A	INTERNATIONAL ELECTRON DEVICES MEETING-WASHINGTON US, 8 - 11 December 1991, pages 563-566, XP002003298 H. KURIYAMA ET AL.: "high mobility poly-si tft by a new excimer laser annealing method for large area electronics" * page 564; figure 2 * * page 564, column 2, paragraph 2 *	1-3	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 May 1996	Examiner Aran, D
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Application Number
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<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>----- & : member of the same patent family, corresponding document</p>			